

AMENDMENTS TO THE CLAIMS:

The following listing of claims replaces all prior listings, and all prior versions, of claims in the application.

LISTING OF CLAIMS:

1. (Currently amended) An apparatus for producing a single crystal comprising a crucible for holding a raw material, a heating device for heating the raw material in said crucible, and a crystal transporting device for transporting a seed crystal upwards from the inside of said crucible,

wherein the heating device is a high-frequency induction heater including a high-frequency coil for heating the crucible, and

wherein the apparatus further comprises a heat conducting member which extends upwards at least from the vicinity of the upper end portion of the side wall of said crucible, which surrounds a formed single crystal, and which is made of a material having heat conductivity.

2. (Currently amended) An apparatus for producing a single crystal comprising a crucible for holding a raw material, a heating device for heating the raw material in said crucible, and a crystal transporting device for transporting a seed crystal upwards from the inside of said crucible,

wherein the heating device is a high-frequency induction heater including a high-frequency coil for heating the crucible, and

wherein the apparatus further comprises an interface portion radiation heat blocking member for blocking, at least during cooling after the formation of a single crystal, the radiation heat toward an upper portion above the interface portion between a taper portion, which is connected with a seed crystal of the formed single

crystal and has a diameter gradually becoming increased, and a cylindrical straight body portion, which is connected with the taper portion of the formed single crystal.

3. (Currently amended) A method for producing a single crystal comprising the step of heating a crucible which holds a raw material and pulling up a seed crystal while the seed crystal is in contact with a melt of the raw material so as to produce a single crystal,

wherein the crucible is heated by a high-frequency induction heater including a high-frequency coil for heating the crucible, and

wherein the diameter of the single crystal is increased during formation of a taper portion of the single crystal in an initial stage of growth of the single crystal, and the single crystal is cylindrically grown connecting with the taper portion during formation of a straight body portion of the single crystal, while the radiation heat which reaches the taper portion of the single crystal from an inner surface of said crucible is blocked during the formation of the taper portion of the single crystal.

4. (Currently amended) An apparatus for producing a single crystal comprising a crucible for holding a raw material, a heating device for heating the raw material in said crucible, and a crystal transporting device for transporting a seed crystal upwards from the inside of said crucible,

wherein the heating device is a high-frequency induction heater including a high-frequency coil for heating the crucible, and

wherein the apparatus comprises an in-crucible radiation heat blocking member which surrounds a single crystal and which blocks the radiation heat from an inner surface of said crucible toward the single crystal positioned in the inside of

said crucible and an in-crucible radiation heat blocking member transporting device for transporting said in-crucible radiation heat blocking member in a vertical direction, while said in-crucible radiation heat blocking member transporting device transports said in-crucible radiation heat blocking member to the position surrounding a taper portion of the single crystal during formation of the taper portion of the single crystal to increase the diameter of the single crystal in an initial stage of growth of the single crystal and transports said in-crucible radiation heat blocking member to the position at a distance from the single crystal during formation of a straight body portion of the single crystal cylindrically grown connecting with the taper portion.

5. (Currently amended) A method for producing a single crystal comprising the step of heating a portion in the side lower than the upper end portion of a crucible which holds a raw material of a single crystal and pulling up a seed crystal while the seed crystal is in contact with a melt of the raw material so as to produce a single crystal,

wherein the crucible is heated by a high-frequency induction heater including a high-frequency coil for heating the crucible, and

wherein the diameter of the single crystal is increased during formation of a taper portion of the single crystal in an initial stage of growth of the single crystal, and the single crystal is cylindrically grown connecting with the taper portion during formation of a straight body portion of the single crystal, while the radiation heat toward an upper portion above the upper end portion of said crucible is blocked during the formation of the straight body portion of the single crystal.

6. (Currently amended) An apparatus for producing a single crystal comprising a crucible for holding a raw material, a heating device for heating the raw material in said crucible, and a crystal transporting device for transporting a seed crystal upwards from the inside of said crucible,

wherein the heating device is a high-frequency induction heater including a high-frequency coil for heating the crucible, and

wherein the apparatus comprises a straight body portion radiation heat blocking member which can pass through a single crystal and which blocks the radiation heat toward an upper portion above the upper end portion of said crucible and a straight body portion radiation heat blocking member transporting device for transporting said straight body portion radiation heat blocking member in a vertical direction, while the heating device heats a portion in the side lower than the upper end portion of said crucible, and said straight body portion radiation heat blocking member transporting device transports said straight body portion radiation heat blocking member to the position at a distance from the upper end portion of said crucible during formation of a taper portion of the single crystal to increase the diameter of the single crystal in an initial stage of growth of the single crystal and positions said straight body portion radiation heat blocking member in between the outer perimeter surface of the straight body portion of the single crystal and the inner perimeter surface of said, crucible or in between the outer perimeter surface of the straight body portion of the single crystal and the upper end portion of said crucible during formation of the straight body portion of the single crystal cylindrically grown connecting with the taper portion.

7. (Original) An apparatus for producing a single crystal comprising a crucible for holding a raw material, a high-frequency generation device including a high-frequency coil disposed surrounding said crucible, and a crystal transporting device for rotating and transporting a seed crystal upwards from the inside of said crucible,

wherein the apparatus comprises a wall-side heating member for heating a portion in between the upper end portion and the lower end portion of the side wall of said crucible by the operation of said high-frequency generation device.

8. (Original) An apparatus for producing a single crystal comprising a crucible for holding a raw material, a high-frequency generation device including a high-frequency coil disposed surrounding said crucible, and a crystal transporting device for rotating and transporting a seed crystal upwards from the inside of said crucible,

wherein the apparatus comprises a bottom-side heating member for heating a central portion of the bottom by the operation of said high-frequency generation device, on the bottom of said crucible.

9. (Original) The apparatus for producing a single crystal, according to Claim 7, wherein said wall-side heating member comprises a protrusion-shaped member which is made of an electrically conductive material and which is disposed in between the upper end portion and the lower end portion of the outer surface of the side wall of said crucible while being extended along the circumferential direction of the outer surface of the side wall of said crucible.

10. (Original) The apparatus for producing a single crystal, according to Claim 8, wherein said bottom-side heating member comprises a heat conducting portion made of a heat conductive material for conducting heat to a central portion of the outer surface of the bottom of said crucible and a board-shaped heat generation portion which has a diameter larger than the diameter of the heat conducting portion and which is made of an electrically conductive material.

11. (Original) The apparatus for producing a single crystal, according to Claim 8, wherein said bottom-side heating member comprises a heat insulating member made of a heat insulating material having a through hole at the position in accordance with a central portion of the outer surface of the bottom of said crucible and a board-shaped heat generation portion which has a diameter larger than the diameter of the through hole of said heat insulating member and which is made of an electrically conductive material.

12. (Cancelled).

13. (New) The apparatus for producing a single crystal, according to Claim 2, wherein the apparatus further comprises a heat conducting member which extends upward at least from the vicinity of the upper end portion of the side wall of said crucible, which surrounds a formed single crystal, and which is made of a material having heat conductivity.

14. (New) The apparatus for producing a single crystal, according to Claim 13, wherein the radiation heat blocking member is located at the upper end of the heat conducting member.

15. (New) The apparatus for producing a single crystal, according to Claim 2, further comprising a refractory member surrounding the crucible and extending above the crucible, and wherein the interface portion radiation heat blocking member is a lid portion of the refractory member.

16. (New) The apparatus for producing a single crystal, according to Claim 4, wherein the in-crucible radiation heat blocking member is a radiation heat shielding plate in a shape of a cone along the taper portion of the single crystal.

17. (New) The apparatus for producing a single crystal, according to Claim 16, wherein an angle of inclination of the conical surface of the radiation heat shielding plate is substantially equal to the angle of inclination of the taper surface of the taper portion of the single crystal.